

PATENT

Any: Dkt. No. AMAT/5006/CPI/UB/JS

IN THE SPECIFICATION:

Please replace paragraph [0006] with the following amended paragraph:

[0006] An apparatus for controlling the flow of liquid material from a liquid material source to a process chamber is disclosed. The apparatus comprises an injector/vaporizer disposed proximate to the process chamber. The injector/vaporizer includes one or more piezoelectric grids located proximate to a vaporization chamber. The one or more piezoelectric grids function to control the flow of liquid material into the vaporization chamber. Each piezoelectric grid includes interlocking arrays of stripes strips attached to a frame.

Please replace paragraph [0013] with the following amended paragraph:

[0013] FIG. 6 illustrates a top view of a grid including interlocking arrays of stripes strips attached to a frame;

Please replace paragraph [0015] with the following amended paragraph:

[0015] FIG. 7B is a top view of the grids depicted in FIG. 7A showing that the interlocking arrays of stripes strips form a plurality of pores;

Please replace paragraph [0029] with the following amended paragraph:

[0029] FIG. 6 illustrates a top view of a grid 405 including interlocking arrays of stripes strips 502, 504 attached to a frame 500. Each stripe strip in the array of stripes strips 502 is electrically connected to the others via contacts 508. Each stripe strip in the array of stripes strips 504 is electrically connected to the others via contacts 506.

BEST AVAILABLE COPY

Page 2

338972_1

PATENT

PRIORITY Dkt. No. AMAT/5008/CP/1/B/PJS

Please replace paragraph [0030] with the following amended paragraph:

[0030] The ~~stripes~~ strips 502, 504 are made of a piezoelectric material that expands uniformly in each direction and has a maximum material expansion of n . Thus, the distance between each of the ~~stripes~~ strips 502, 504 should be no more than $2n$ and the distance between the edges of each ~~stripes~~ strips 502, 504 and the frame 500 should be no more than n .

Please replace paragraph [0031] with the following amended paragraph:

[0031] When the maximum expansion for the grid 405 is reached, the aperture opening thereof is zero. This is because each of the interlocking arrays expands such that adjacent ~~stripes~~ strips 502, 504 touch one another as well as the edges of the frame.

Please replace paragraph [0032] with the following amended paragraph:

[0032] Referring to FIGS. 7A-7B, the two or more grids 405 may be stacked perpendicular to one another such that the interlocking arrays of ~~stripes~~ strips 502, 504 form a plurality of pores 702. As the arrays of ~~stripes~~ strips on each of the grids 405 expands to the maximum expansion of n , the diameter of the each pore in the plurality of pores 702 is reduced to zero. The distance between each of the two or more grids 405 is variable. The distance between each of the grids is preferably less than about 1 cm.

Please replace paragraph [0034] with the following amended paragraph:

[0034] A voltage is applied to each of the arrays of ~~stripes~~ strips 502, 504 through contacts 506, 508. The amount of expansion for each ~~stripe~~ strip depends on the composition of the piezoelectric material as well as the magnitude of the applied voltage. As such, varying the voltage applied to the ~~stripes~~ strips 502, 504 adjusts the

PATENT

Atty. Dkt. No. AMAT/5008/CP/L/B/PJS: 3/24/05

size of the opening between adjacent ~~stripes~~ strips, thereby affecting the flow rate of liquid material into the vaporizer chamber 232.

Please replace paragraph [0042] with the following amended paragraph:

[0042] In step 804, the one or more grids 405 are opened for a first period of time T1. The one or more grids 405 are opened by contracting one or more of the interlocking arrays of ~~stripes~~ strips 502, 504. The ~~stripes~~ strips 502, 504 may be contracted by varying the applied voltage provided through contacts 506, 508.

Please replace paragraph [0044] with the following amended paragraph:

[0044] FIG. 9 depicts a timing diagram of a drive signal 900 produced by a controller (not shown) that controls the operation of the injector/vaporizer 122. The drive signal 900 represents a voltage or current delivered to the one or more piezoelectric grids 405. When the drive signal 900 is at a first level 902, the arrays of ~~stripes~~ strips 502, 504 are fully expanded to shut-off the flow of liquid material (LM). When the drive signal 900 is at a second level 904, the arrays of ~~stripes~~ strips 502, 504 are not fully expanded to provide a flow of liquid material (LM) therethrough. The controller maintains the drive signal 900 at the first level 902 for a period of time T1. T1 is typically between approximately 2 milliseconds and 30 milliseconds. The controller then changes the signal 900 to level 904 for a period of time T2. T2 is typically between approximately 1 second and 10 seconds.

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☒ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.